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No. 7

## THE LAUXANIIDAE (DIPTERA) OF SOUTHERN QUEBEC AND ADJACENT REGIONS.

BY G. E. SHEWELL,

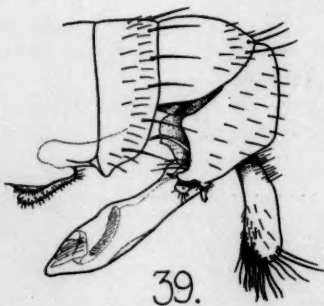
Ottawa, Ont.

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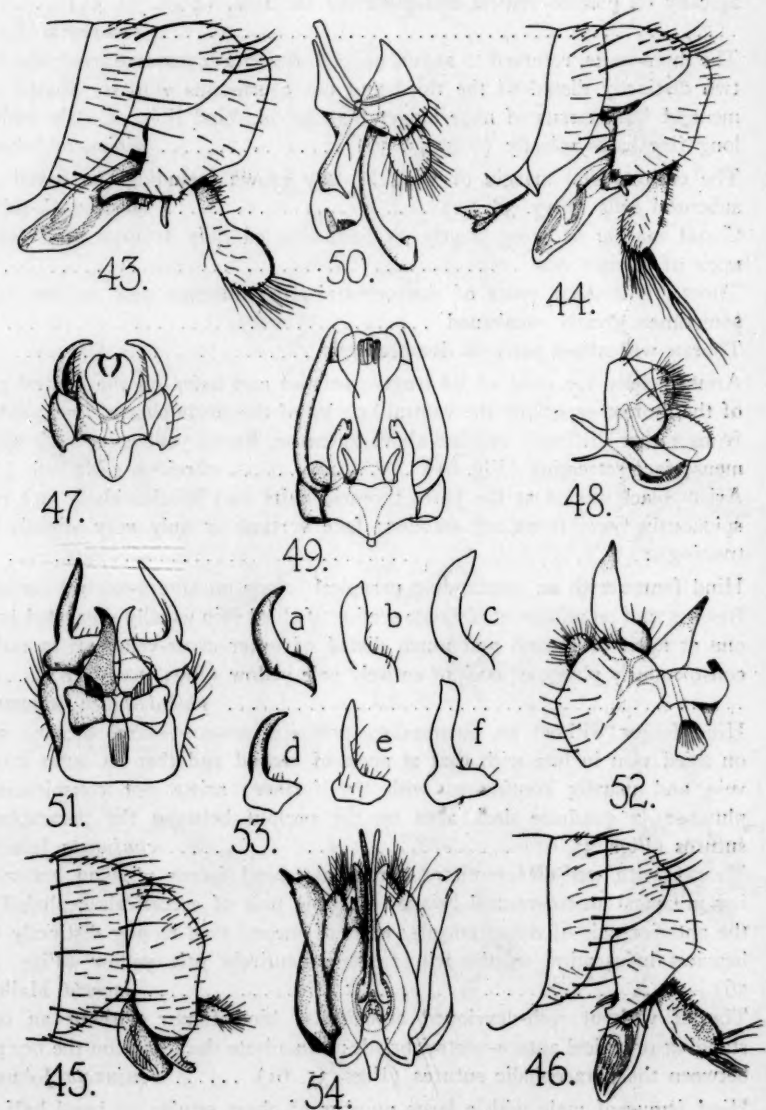
### *Homoneura* Van der Wulp

KEY TO SPECIES.

1. Wings with distinct infuscations ..... 2  
Wings without infuscations ..... 15
2. Apex of the second vein of the wing very little or not at all infuscated; the other infuscations mainly confined to the veins, faint on the membrane; head large; frons swollen, lemon yellow in fresh specimens; hairs and bristles on ventral part of head and thorax and on legs very fine, golden; abdomen short; (Figs. 37, 64) ..... *citrefrons* Malloch (♂)  
Apex of second vein distinctly infuscated; other characters not as above 3
3. Third vein with two fuscous spots in addition to the one at inner cross-vein and the one at apex ..... 4  
Third vein with only one fuscous spot between inner cross-vein and apex 5
4. Eighth abdominal tergite of male with a backwardly-directed spine at apex of the downwardly-directed lateral process, on its posterior angle.....  
..... *fraterna* Loew.  
Eighth abdominal tergite of male with a slightly curved downwardly-directed spine at apex of lateral process at its anterior angle .... *pernotata* Malloch
5. Second, and sometimes part of basal or third segment of hind-tarsus blackened, in male the blackened parts generally dilated ..... 6  
Hind tarsi pale, the segments in male not dilated ..... 10
6. Two segments of hind tarsus in male and female partly blackened; the apex of the three basal segments in male each with a pair of long apically dilated hairs ..... 7  
Only one segment of hind tarsus blackened; no such hairs on tarsus of males ..... 8
7. Second and third segments of hind tarsus in both sexes partly blackened, dilated in male; hairs at apex of cerci in male much shorter than cerci themselves, (Fig. 41) ..... *ornatipes* Johnson  
First and second segments of hind tarsus in both sexes partly blackened, dilated in male; hairs at apex of male cerci as long as or longer than cerci themselves, (Figs. 44, 53) ..... *melanderi* Johnson
8. Costal margin of wing infuscated from apex of auxiliary vein to apex of fourth, less distinctly so between cross-veins; second segment of hind tarsus distinctly but not greatly dilated in male; hind tibia without long fine hairs apically on posterior surface, (Figs. 46, 60) ..... *houghi* Coquillett  
Costal margin of wing not infuscated proximad of a line drawn vertically from outer cross-vein ..... 9



9. The spots at the apex of second vein, on middle of ultimate section of third, and on outer cross-vein almost in a straight line, sometimes forming a continuous transverse band; dilated segment of hind tarsus of male usually as broad or broader than long; hind tibia of male with some long fine hairs apically on postero-ventral and posterior surfaces, (Figs. 39, 55) ..... *compedita* Loew.  
The three spots, referred to above, never forming a transverse band, the first two distinctly distad of the third and not continuous with it; dilated segment of hind tarsus of male longer than broad; hind tibia of male without long fine hairs apically (Fig. 43, 59) ..... *disjuncta* Johnson
10. The entire costal margin of wing broadly brown including the costal and subcostal cells (Figs. 38, 62) ..... *sheldoni* Coquillett  
Costal margin of wing largely hyaline, clouded only from a little before apex of second vein ..... 11
11. Thorax with four pairs of dorsocentrals, the anterior pair or two pairs sometimes greatly weakened ..... 12  
Thorax with three pairs of dorsocentrals ..... 14
12. Arista yellow for most of its length; bristles and hairs on the ventral part of the thorax, especially the ventral bristles of the sternopleura, fine, golden; frons rather distinctly swollen above antennae, lemon yellow in fresh specimens; face retreating (Fig. 61) ..... *citreifrons* Malloch (♀)  
Arista black except at the base; thoracic hairs and bristles black, not conspicuously fine; frons not swollen; face vertical or only very slightly retreating ..... 13
13. Hind femur with an outstanding preapical bristle on antero-ventral surface; fuscous spot on middle of ultimate section of third vein usually separated from one at apex of second and much distad of outer cross-vein; arista rather conspicuously plumose; occiput entirely pale yellow (Figs. 40a, b, 58) ..... *philadelphica* Macquart  
Hind femur without an outstanding preapical antero-ventral bristle; spot on third vein in line with that at apex of second and that on outer cross-vein and usually continuous with the former; arista not conspicuously plumose; a quadrate dark area on the occiput between the paracephalic sutures (Figs. 35, 61) ..... *conjuncta* Johnson
14. Thorax with well-differentiated acrosticals; hind femur with an outstanding preapical antero-ventral bristle; a strong pair of acrosticals cephalad of the anterior pair of dorsocentrals; apex of second vein having distinctly the heaviest infuscation on the wing; occiput entirely pale yellow (Figs. 42, 56) ..... *incerta* Malloch  
Thorax without well-developed acrosticals; hind femur without an outstanding preapical antero-ventral bristle; a quadrate dark area on the occiput between the paracephalic sutures (Figs. 35, 61) ..... *conjuncta* Johnson
15. Hind femur of male with a large number of short setulae on basal half of ventral surface; cheek over half as high as eye; hind tibia of male without erect soft hairs; last abdominal sternite of male without two long processes; seventh abdominal tergite of female compressed, almost cylindrical (Fig. 45)



LAUXANIIDAE OF SOUTHERN QUEBEC

- ..... *littoralis* Malloch  
 Hind femur of male without black setulae on basal half of ventral surface; cheek less than half as high as eye; hind tibia of male with some soft erect hairs basally on the ventral surface; last abdominal sternite of male with two long processes; seventh abdominal tergite of female not compressed nor cylindrical ..... 16
16. Hind femur of male without a long fine hair close to apex on postero-ventral surface; processes of last abdominal sternite pointed at apices; seventh abdominal tergite not with a dense group of hairs on each side; length  $4\frac{1}{2}$ - $5\frac{1}{2}$  mm. (Fig. 36) ..... *bispina* Loew.  
 Hind femur of male with a long fine hair close to apex on postero-ventral surface; processes of last sternite rounded at apices; seventh tergite with a dense group of short, black, setulose hairs at apex on each side; length  $3\frac{1}{2}$ -4 mms. .... *seticauda* Malloch

## ANNOTATED LIST OF SPECIES

*Lauxania cylindricornis* Fab. (1794, Ent. Syst. 4: 332.) Common and widely distributed throughout Canada including the North West Territories. Collection dates range from mid-May to early September.

*Camptoprosopella* species 1. (Figs. 47, 48 of this paper.) Fairly common within its range. Kentville, N. S. July 5th, Sept. 1st; Boucherville, Ile Jesus, Joliette, Lachine, LaTrappe, Montreal, Napierville, St. Eustache, St. Louis, St. Placide, Sully, Que. June 15th, Aug. 19th; Jordan, Ottawa District, Ont. July 3rd, Aug. 24th. Algonquin, Ill. June 11th, 1895 (Coquillett).

*Camptoprosopella* species 2. (Figs. 49, 50 of this paper.) Malloch & McAtee, Proc. U. S. N. M. vol. 65, Art. 12, Plate 2, Fig. 17 (C. verticalis). Commoner than species 1 in this region. Abbotsford, Boucherville, Ft. Coulonge, Ile Jesus, Joliette, Kazubazua, L'Assomption, Montreal, Mt. Orford, Oka, Ste. Anne de Bellevue, Que. June 11th, Aug. 28th; Ottawa, Ont. June 20th, Aug. 17th; Aweme, Treesbank, Man. June 12th, Aug. 5th; Estevan, Saskatoon, Sask. June 22nd Aug. 2nd; Chin, Edmonton (very long series), Gull Lake, High Prairie, Lethbridge, Medicine Hat, Wabamun, Wetaskiwin, Alta. June 20th, Oct.; Creston, B. C. July 1st and 2nd (Dennys); Salem, Mass. July 9th (Tothill); Clinton, Ia. June 23rd (Walley); S. Haven, Mich. July 14th; S. Dak (Aldrich); Bismarck, N. Dak. July 21st (Gabrielson); Denver, Colo. June 17th (Jackson). This species is distinguished from *C. verticalis* Lw. by its larger size, less densely plumose arista, narrower palpi, and the structure of the male genitalia.

*Pseudogriphoneura gracilipes* Lw. (1861, Dipt. Amer. Sept. Indig. Cent. 1: 85.) Abbotsford Aylmer, LaTrappe, Rigaud, Que., July 13th, Sept. 9th; Jordan, Ottawa, Ont. Aug. 5th, June 24th; Champaign Co. Ill. July 10th, Aug. 2nd (V. Smith).

*Minettia americana* Mall. (1923, Proc. Ent. Soc. Wash. 25: 53.) Covey Hill, Laniel, Megantic, Ste. Hilaire, Que. June 17th, 22nd; Coldstream, Lake of Bays, Lobo, Strathroy, Ont. May 28th, June 28th. This species is apparently not so common in this region as the other forms belonging to this group.

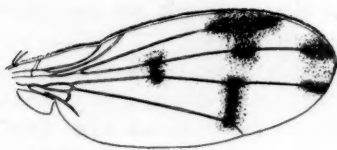
*Minettia americanella* n. sp. (Figs. 4, 5, 6) Chelsea, Que. May 26th; Trenton, Ont. June 16th; Salmon Arm, B. C. June 16th (Dennys). Common. For additional locality data, see description.

*Minettia cana* Mel. (1913, Psyche 20: 72.) Seven ♀♀, LaTrappe, Que., May 29th, 30th (Ouellet). Not at all common. Easily distinguished from *M. lupulina* by the characters cited in the key. Unlike the specimen from which Melander's description was made, all these have well-developed preapical bristles on the hind tibiae.

*Minettia lobata* n. sp. (Figs. 7, 8, 9) Chelsea, Covey Hill, Que. May 26th, June 19th. Common. For additional data see description.

*Minettia lupulina* Fabr. (1787 Mart. Ins. 2: 344: 1794 Ent. Syst. 4: 323: 1805 Syst. Antl. p. 298.) Very common and widely distributed across Canada including North West Terr. Also from Newfoundland. Late May to mid Sept. In copula Aug. 20th (Knowlton, Que.) I have examined the male genitalia of many specimens and in all of them the prongs of the forked process arising from the ventral sclerite are asymmetrically displaced to the right, as shown in Fig. 13. However I think it is very unlikely that, when Malloch drew this structure (Proc. U. S. N. M. vol. 65, Art. 12, pl. 1 fig. 9.) he had before him anything but a true male of *lupulina*.

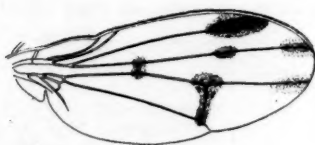




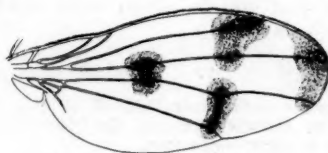
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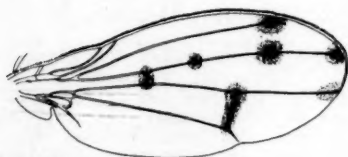
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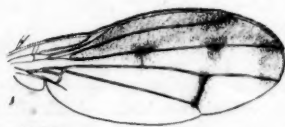
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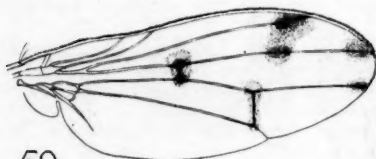
62.



58.



63.



59.



64.

*Minettia lyraformis* n. sp. (Figs. 10, 11, 12.) Hemmingford, Que. July 2nd; Ottawa, Ont. Aug. 6th. Common. For additional data, see description.

*Minettia puncticeps* Coq. (1902. Jr. N. Y. Ent. Soc. 10: 178.) Not common. One ♂, Abbotsford, Que. June 11th (Shewell). Swept from basswood.

*Sapromyza aspinosa* n. sp. (Figs. 20, 21.) Probably fairly common. For locality data, see description.

*Sapromyza browni* Curr. (1933. Amer. Mus. Novit. No. 673, p. 8.) Barberd, N. B. June 25th (McKenzie); Abbotsford, Fairy Lake (nr. Hull), Hull, Joliette, Lanoraie, LaTrappe, Montreal, Rigaud, Que. June 3rd, Aug. 9th; Bowmanville, Low Bush (Lake Abitibi), Mer Bleue, Norway Pt. (Lake of Bays), Pt. Pelee, Ont. May 28th, Aug. 1st. Common. By far the most records are between June 1st and 15th, with a few isolated records later, up to Aug. 9th. Swept from basswood.

*Sapromyza currani* n. sp. (Figs. 31, 32.) One record only. See description.

*Sapromyza fusca* n. sp. (Fig. 34.) Not common locally, though apparently wide in range. For locality data see description.

*Sapromyza hyalinata* Mg. (1826. Syst. Besch. 5: 300.) Abbotsford, Aylmer, Fairy Lake (nr. Hull), Hull, Knowlton, Montreal, Oka, Ste Hilaire, Que. May 24th, July 18th; Jordan, Norway Pt. (L. of Bays), Ottawa, Ont. June 19th, Aug. 28th; Wakau, Sask. July 18th (King); Agassiz, Cranbrook, B. C. May 10th, 12th. Not very common. Lack of material has prevented a thorough study of the genitalia, but there is evidence of some variation which may be specific.

*Sapromyza novaescotiae* n. sp. (Figs. 22, 23.) One record only. See description.

*Sapromyza ouelletii* n. sp. (Figs. 16, 17.) Probably rather common. For locality data see description.

*Sapromyza rotundicornis* Loew. (1863. Dipt. Am. Sept. Ind. Cent. 3: 56.) A pair in copula, Grand River, N. S. July 15th (Prebble); Hemmingford, Que. July 21st (Maltais); Brockville, Ottawa, Trenton, Ont. July 27th, Aug. 23rd; Victoria, B. C. June 29th (Carter); nr. Hartford, Conn. (?) June 23rd (C. G. Hewitt). Not very common.

*Sapromyza serrata* Mall. (1923. Proc. Ent. Soc. Wash. 25: 52.) So far as I am aware, the only certain records of this species in Canada are four males from Abbotsford, Que. taken June 14th, 1937. Most of the other records that I have seen are referable to *subserrata* n. sp. Malloch has figured the genitalia (1925. Proc. U. S. N. M. vol. 65 art. 12, pl. 1. Figs. 10, 10a. The explanation of Fig. 10a should read "*Sapromyza serrata*, superior forceps").

*Sapromyza spatulata* n. sp. (Figs. 25, 26.) Not very common. For locality data, see description.

*Sapromyza subserrata* n. sp. (Figs. 29, 30.) Common. For locality data, see description.

*Homoneura bispina* Loew. (1861. Dipt. Amer. Sept. Indig. Cent. 1: 79.) Kentville, N. S. July 8th, Aug. 1st (Gorham); Abbotsford, Berthier, Farnham, Ft. Coulonge, Ile Jesus, Napierville, St. Johns, St. Placide, Que., May 31st-July 9th; Jordan, Niagara Glen, Ottawa, Ont., June 26th-July 21st; Teulon, Man., July 8th Aug. 1st (Hunter); Lethbridge, Alta., July 19th (Strickland). Fairly common and widely distributed. Swept from reeds on river banks with *Campoprotopella* spp.

*Homoneura citreifrons* Mall. (1920 Can. Ent. 52: 127.) Abbotsford, Que., June 2nd-14th, 1937. Four ♂♂, eight ♀♀. swept from basswood. This species is evidently very close to *conjuncta* Johns. by the male genital structures, and also the infuscation of the female wing. (See Figs. 35, 37, 61, 64).

*Homoneura compedita* Loew. (1861. Dipt. Amer. Sept. Indig. Cent. 1: 76.) Kentville, N. S., July 8th (Gorham); Common and widely distributed in Quebec and Ontario (No records from further west in the Nat. Coll.). June 2nd-Aug. 25th. In copula July 5th. Although the dilated tarsal segment of the male of this species is typically as broad as long, it not infrequently resembles that of *disjuncta* Johns. in being only half as broad as long.

*Homoneura conjuncta* Johnson (1914. Psyche 21: 22) Abbotsford, Knowlton, Lachine, Que., June 19th-July 5th; Leamington, Ont. June 7th (Walley). A comparison of my Fig. 35 with Malloch's drawing of the male hypopygium of this species (Proc. U. S. N. M. vol. 65, art. 12, pl. 2, fig. 22), suggests that there may be two close species involved here. My drawing was made from a male from Leamington, Ont. which is clearly conspecific with a male lent to me by Dr. Banks, determined as *conjuncta* by Johnson himself.

*Homoneura disjuncta* Johnson (1914. Psyche 21: 22). Abbotsford, Hemmingford, Joliette, LaTrappe, Montreal, St. Martin, Que., June 13th-Aug. 15th; Orillia, Ottawa, Pt. Pelee, Ont., June 23rd-Aug. 15th. Fairly common.

*Homoneura fraterna* Loew. (1861. Dipt. Amer. Sept. Indig. Cent. 1: 77). Norway Pt. (L. of Bays), Ont. Aug. 1st (McDunnough), Ottawa, Ont. Aug. 14th (Beaulne). There are no certain records from Quebec so far as I know, but the Ottawa record indicates that it is a Quebec species. The records in the Quebec List (21) refer to *pernotata* Mall., except perhaps in the case of some isolated female captures. I cannot say whether the females of this species and *pernotata* Mall. are distinguishable, but probably they are not. The differences in the male hypopygia are clearly shown by Malloch (Proc. U. S. N. M. vol. 65, art. 12, pl. 2, figs. 18, 20, 21, 24, 26).

*Homoneura houghi* Coq. (1898. Can. Ent. 30:277). A male and female from Kazubazua, Que. Aug. 17th (Walley), and a female from LaTrappe, Que. June 9th (Ouellet). Apparently not common.

*Homoneura incerta* Mall. (1914. Proc. Biol. Soc. Wash. 27:36). Abbotsford, Hull, Kazubazua, Knowlton, Mt. Orford, Rigaud, Que. July 14th, Sept. 3rd; Norway Pt. (L. of Bays), Ottawa, Ont. July 28th-Aug. 18th. Fairly common. Swept from basswood.

*Homoneura littoralis* Mall. (1915. Proc. Biol. Soc. Wash. 28). Ft. Coulonge, Hull, Lanoraie, LaTrappe, Missisquoi Bay, Roberval, St. Placide, Que. June 11th-July 28th; Ottawa, Pt. Pelee, Ont., May 30th-July 21st; Aweme, Man., May 25th, June 14th (Bird.). Fairly common. In copula July 14th and 15th.

*Homoneura melanderi* Johnson (1914. Psyche 21:21). A long series taken by Bro. Ouellet at LaTrappe, Que. between June 9th and August 26th. In copula July 4th and Aug. 24th.

*Homoneura ornatipes* Johns. (1914. Psyche 21:20). The drawing of the male hypopygium (fig. 41) was made from a specimen lent to me by Dr. Curran. The species has not been recorded in Canada.

*Homoneura pernotata* Mall. (1920 Can. Ent. 52:128). Abbotsford, Hull, Lanoraie, LaTrappe, Montreal, Rigaud, Sully, Que. July 9th-Aug. 30th; Ottawa, Ont., June 26th (Metcalf); Aweme, Transcona, Man., July 29th-Aug. 6th (Brooks & Bird.); Keremeos, B. C., June 27th (Garrett). Fairly common. Swept from basswood and spiraea. (See above, under *H. fraterna* Lw.).

*Homoneura philadelphica* Macq. (1843. Dipt. Exot. 2 (3) :191). Common and widely distributed in Quebec and Ontario. June 22nd-Sept. 3rd. Swept from basswood. The shape of the inferior forceps (using this term to apply to the downwardly-projecting structures arising beneath the lateral edges of the eighth tergite) is quite variable in this species. Of six males examined at random from different localities, two were found to agree with Fig. 40b., three with Fig. 40a., and one was an intermediate form having the backward twist of 40a and the rounded extremity of 40b (see also, Malloch, Proc. U. S. N. M. vol. 65, art. 12, pl. 2, fig. 19).

*Homoneura seticauda* Mall. (1914. Proc. Biol. Soc. Wash. 27:34. Drawing of ♂ hypopygium. Pl. II, Fig. 9) Ottawa, Ont. July 20th, 21st (Beaulieu), Pleasant Valley, Ia. June 23rd (Walley).

*Homoneura sheldoni* Coq. (1898. Can. Ent. 30:277). Lanoraie, Que. July (Chagnon); Mer Bleue, Ont. Aug. 9th, Sept. 3rd (Walley and Brown).

## REFERENCES

1. Aldrich, J. M. 1905. Cat. of N. Amer. Dipt.
2. Coquillett, D. W. 1898. New species of Sapromyzidae. Can. Ent. 30:277.
3. Coquillett, D. W. 1902. New Acalyptate Diptera from N. America. Jr. N. Y. Ent. Soc. 10:177.
4. Coquillett, D. W. 1910. The type species of the N. American Genera of Diptera. Proc. U. S. N. M. vol. 37, No. 1719.
5. Curran, C. H. 1933 New N. American Diptera. Amer. Mus. Nat. History. Novit. No. 673, p. 8.
6. Curran, C. H. 1934. The Families and Genera of N. Amer. Dipt. New York.
7. Fabricius, J. C. 1794. Ent. Syst. Vol. 4.
8. Fitch, Asa, 1856. First and second reports on the Noxious, Beneficial and other Insects of the State of New York. St. Agr. Soc. Albany.
9. Hendel, F. 1908. Wytsman's Gen. Ins. Fasc. 68.
10. Hendel, F. 1925. Neue Übersicht über die bisher bekannt gewordenen Gattungen der Lauxaniiden, nebst Beschreibung neuer Gattungen u. Arten. Encycl. ent., Ser. B. II, Dipt. 2, p. 102.
11. Johnson, C. W. 1914. Some New and Interesting Species of Sapromyza. Psyche 21:20.
12. Loew, H. 1858. Wien. Ent. Monat. 2:14.
13. Loew, H. 1861, 1863. Cent. I, III.
14. Macquart, Jean, 1843. Dipt. Exot. vol. 2, pt. 3.
15. Malloch, J. R. 1914. Some undescribed North American Sapromyzidae. Proc. Biol. Soc. Wash., 27:29.
16. Malloch, J. R. 1920. Some New N. American Sapromyzidae (Dipt.). Can. Ent. 52:126.
17. Malloch, J. R. 1923. Some New Genera and Species of Lonchaeidae and Sapromyzidae, (Dipt.). Proc. Ent. Soc., Wash. 25:45.
18. Malloch, J. R. and W. L. McAtee, 1925. Keys to Flies of the Families Lonchaeidae, Pallopteridae and Sapromyzidae etc. Proc. U. S. N. M. vol. 65, Art. 12.
19. Meigen, J. W. 1826. Syst. Besch. vol. 5.
20. Melander, A. L. 1913. A synopsis of the Sapromyzidae. Psyche 20:57.
21. Petch, C. E. and J. B. Maltais, 1932. A preliminary List of the Insects of the Prov. of Que., pt. II, Diptera, Suppl. to 24th, Rep. Que. Soc. Protect. Plants.



## EXPLANATION OF PLATES

## Plate 9

- Fig. 1. *Minettia americana*, male genitalia, ventral view.  
 Fig. 2. *Minettia americana*, male genitalia, lateral view.  
 Fig. 3. *Minettia americana*, genital sternite of female, ventral view.  
 Fig. 4. *Minettia americanella*, male genitalia, ventral view.  
 Fig. 5. *Minettia americanella*, male genitalia, lateral view.  
 Fig. 6. *Minettia americanella*, genital sternite of female, ventral view.  
 Fig. 7. *Minettia lobata*, male genitalia, ventral view.  
 Fig. 8. *Minettia lobata*, male genitalia, lateral view.  
 Fig. 9. *Minettia lobata*, genital sternite of female, ventral view.  
 Fig. 10. *Minettia lyraformis*, male genitalia, ventral view.  
 Fig. 11. *Minettia lyraformis*, male genitalia, lateral view.  
 Fig. 12. *Minettia lyraformis*, genital sternite of female, ventral view.  
 Fig. 13. *Minettia lupulina*, male genitalia, ventral view.  
 Fig. 14. *Minettia lupulina*, male genitalia, lateral view.  
 Fig. 15. *Minettia puncticeps*, tip of abdomen of male, lateral view.

## PLATE 10

- Fig. 16. *Sapromyza ouelleti*, male genitalia, ventral view.  
 Fig. 17. *Sapromyza ouelleti*, male genitalia, lateral view.  
 Fig. 18. *Sapromyza browni*, male genitalia, ventral view.  
 Fig. 19. *Sapromyza browni*, male genitalia, lateral view.  
 Fig. 20. *Sapromyza aspinosa*, male genitalia, ventral view, part of right side of penis omitted to show structure of inferior forceps.  
 Fig. 21. *Sapromyza aspinosa*, male genitalia, lateral view.  
 Fig. 22. *Sapromyza novaescotiae*, male genitalia, ventral view, part of left side of penis omitted to show structure of inferior forceps.  
 Fig. 23. *Sapromyza novaescotiae*, male genitalia, lateral view.  
 Fig. 24. *Sapromyza rotundicornis*, male genitalia, ventral view.

## PLATE 11

- Fig. 25. *Sapromyza spatulata*, male genitalia, ventral view.  
 Fig. 26. *Sapromyza spatulata*, male genitalia, lateral view.  
 Fig. 27. *Sapromyza pictiventris* male genitalia, ventral view, part of left superior forceps removed.  
 Fig. 28. *Sapromyza pictiventris* male genitalia, lateral view.  
 Fig. 29. *Sapromyza subserrata*, male genitalia, ventral view.  
 Fig. 30. *Sapromyza subserrata*, male genitalia, lateral view.  
 Fig. 31. *Sapromyza currani*, male genitalia, ventral view.  
 Fig. 32. *Sapromyza currani*, male genitalia, lateral view.  
 Fig. 33. *Sapromyza hyalinata*, tip of abdomen of male, lateral view.  
 Fig. 34. *Sapromyza fusca*, tip of abdomen of male, lateral view.

## PLATE 12

- Fig. 35. *Homoneura conjuncta*, male genitalia, lateral view.  
 Fig. 36. *Homoneura bispina*, male genitalia, lateral view.  
 Fig. 37. *Homoneura citreifrons*, male genitalia, lateral view.  
 Fig. 38. *Homoneura sheldoni*, male genitalia, lateral view.  
 Fig. 39. *Homoneura compedita*, male genitalia, lateral view.  
 Fig. 40a.  
 40b *Homoneura philadelphica*, male genitalia, lateral view.  
 Fig. 41. *Homoneura ornatifrons*, male genitalia, lateral view.  
 Fig. 42. *Homoneura incerta*, male genitalia, lateral view.

## PLATE 13

- Fig. 43. *Homoneura disjuncta*, male genitalia, lateral view.  
 Fig. 44. *Homoneura melanderi*, male genitalia, lateral view.  
 Fig. 45. *Homoneura littoralis*, male genitalia, lateral view.  
 Fig. 46. *Homoneura houghi*, male genitalia, lateral view.  
 Fig. 47. *Camptoprosopella* species 1, male genitalia, ventral view.  
 Fig. 48. *Camptoprosopella* species 1, male genitalia, lateral view.  
 Fig. 49. *Camptoprosopella* species 2, male genitalia, ventral view.  
 Fig. 50. *Camptoprosopella* species 2, male genitalia, lateral view.  
 Fig. 51. *Lauxania cylindricornis* male genitalia, ventral view.  
 Fig. 52. *Lauxania cylindricornis* male genitalia, lateral view.  
 Fig. 53. *Lauxania cylindricornis* superior forceps, variations in structure; a, b, c lateral, d, e, f ventral views.  
 Fig. 54. *Pseudogriphoneura gracilipes*, male genitalia, ventral view.

## PLATE 14

- Fig. 55. *Homoneura compedita*, wing.  
 Fig. 56. *Homoneura incerta*, wing.  
 Fig. 57. *Homoneura pernotata*, wing.

- Fig. 58. *Homoneura philadelphica*, wing.  
Fig. 59. *Homoneura disjuncta*, wing.  
Fig. 60. *Homoneura houghi*, wing, (female).  
Fig. 61. *Homoneura citreifrons* (female) and *Homoneura conjuncta*, wing.  
Fig. 62. *Homoneura sheldoni*, wing.  
Fig. 63. *Homoneura melanderi* wing.  
Fig. 64. *Homoneura citreifrons*, male, wing.

### NEW LEPIDOPTERA FROM ARIZONA.

BY JOHN L. SPERRY,  
Riverside, California.

#### ***Polia gracea* n. sp.**

Expanse 27-31 mm. Palpi short, stout correct, vestiture heavy, light brown. Head: front maroon, vertex light brown. Thorax and tegulae red brown, collar light brown; abdomen gray-brown, reddish laterally. Primaries very distinctly maculated, bright reddish brown, veins marked with silver gray, (heavily through terminal area), speckled sparingly with dark brown; basal line dark maroon edged outwardly with white, very close to base; space to t.a. line maroon; t.a. line dark red-brown, edged inwardly with white; four distinct outward scallops between costa and inner margin, costal pair slight, that between vein 1 and cell very pronounced with heavy white inner edging and with point of scallop slightly extended outwardly, that between vein 1 and inner margin, moderate. Orbicular not defined, small round, ochreous, touching t.a. line. Reniform indistinct, short, ochreous, with traces of dark centering, imperfectly defined. Median space light ochreous brown, an upright, irregular maroon median shade roughly subparallel to t.p. line. T.p. line narrow, dark red-brown edged outwardly with white, starting at costa, two-thirds out from base, outwardly oblique at costa, strongly outcurved around reniform and cell, subparallel to outer margin between veins 7 and 2, incurved between veins 2 and 1 and slightly outcurved to inner margin; slightly scalloped between veins. S. t. space maroon with a dark sub-apical shade, and a shading toward ochreous as it approaches the inner margin. S. t. line ochreous edged outwardly with a maroon shade, subparallel to outer margin, incurved slightly at vein 7. A broken, slightly scalloped, maroon, terminal line edged inwardly and outwardly with ochreous. Fringes, long, silky, maroon, checkered, the heavy silver-gray markings of the veins continuing through the fringe.

Secondaries unicolorous reddish fuscous, with small, indistinct, elongate discal spot. Fringes pale ochreous with fuscous line through them. Beneath, ochreous with a ruddy tinge, costa of fore wing distinctly ochreous, section between base and t.p. line of primaries darker. Postmedian line on secondaries, dark, subparallel to outer margin. Discal spot shows more clearly than on upper side. Narrow dark terminal line on all wings. Fringes concolorous, checkered on primaries. I know of no other similar species.

*Holotype*—female, White Mts. Ariz., June 27, 1935 (G. H. & J. L. Sperry) No. 4371 in the Canadian National Collection at Ottawa.

*Paratypes*—2 females, Greer Ariz., June 27, 1935. (Dr. J. A. Comstock) 1 female, Williams, Ariz., June 21, 1937 (G. H. & J. L. Sperry); in the Los Angeles Museum and in the collection of Grace H. & John L. Sperry, Riverside Calif.

I take pleasure in naming this beautiful species in honor of my wife, Grace Herreshoff Sperry, my companion and co-worker on all collecting trips in the South West, fully realizing that she is more competent to describe in this genus than am I.

As I have no males, it is possible, as Dr. McDunnough suggests, that this species might belong in the genus *Lacinipolia* McD.

***Stenoporpia mcdunnoughi* n. sp.**

Expanse 36-41 mm. Palpi short stout, porrect. Head: front dark brown, vertex light tan. Thorax fawn brown, collar and tegulae light gray, tipped with brown; abdomen gray irrorate dorsally with dark brown; in the female the dorsal section is fuscous. Fore wings: ground color light tan, t. a. line narrow, indistinct, dark brown, starting at costa about one-fourth out from the base, outwardly oblique from costa to vein 11, perpendicular to costa vein 11 to cell, thence inwardly oblique to cubitus, missing to vein 1, missing portion replaced by light fawn-brown shade extending baseward, the line continues inwardly oblique from 1 to inner margin. T. a. line preceded by basal shade of fawn-brown, heavily irrorate on costal half with dark brown scales. Median shade narrow, indistinct, light fawn color, marked by a darker blotch on the costa four tenths out from the base, the shade runs subparallel to outer margin and includes the discal spot. T. p. line distinct, dark brown, starting from costa at seven-tenths out from the base, perpendicular to costa to vein 9 (this part indistinct or missing in some specimens), thence angling sharply inward to a point just below and slightly outside the discal spot, thence subparallel to outer margin to vein 2, bent inward and outward again between veins 2 and 1, thence curving inward to inner margin. Median area light tan, sprinkled with a very few small specks of dark brown. T. p. line edged outwardly (in some specimens) by a broken narrow gray shade followed by a heavy fawn-brown subterminal area, in the male sparingly and in the female more heavily irrorate with dark brown. An indistinct row of dark-ringed lunules from vein 7 to anal angle forming the narrow dark crenulate s. t. and marginal lines. Fringes very light tan. Discal spots heavy, dark brown, elongate. Secondaries: discal spots distinct, elongate, occasional specimens show an elongated narrow ringlet. Antemedian line oblique from inner margin to cell, dark brown postmedian line from inner margin to vein 6, nearly straight or very slightly incurved; in some specimens continuing, angling inward, very faint but still evident to the costa, edged outwardly with narrow gray white shade followed by sub-terminal shading and lunules as in the primaries. Ground color of costal third is a tan-gray, somewhat lighter than the ground color of the primaries. Beneath unicolorous glistening, pale tan-gray with discal spots and t.p. line showing through.

*Holotype*—male, Estes Park Colo., July 1935 (Mr. E. B. Andrews, Coll.) No. 4372 in the Canadian National Collection at Ottawa.

*Allotype*—female, Alpine Ariz., June 21, 1935. (Grace H. & John L. Sperry); in the Canadian National Collection at Ottawa.

*Paratypes*—1 male and 9 females, White Mts. Ariz. June 12-26th. (Dr. J. A. Comstock and G. H. & J. L. Sperry) in the Los Angeles Museum and in the collection of Grace H. & John L. Sperry, Riverside, Calif.

This species seems nearest to *anellula* B. & McD., but is larger, t.a. line broken, median shade less distinct. Discal dots on both wings heavy, elongate, distinct, usually entire. The warm fawn-brown color of the species marks it at once.

It gives me great pleasure to name this species in honor of Dr. J. McDunnough, of Ottawa, whose friendly encouragement has had much to do with many pleasant collecting trips in out-of-the-way corners of the South West and without whose cordial co-operation I should have hesitated to describe this species.

#### NOTES ON ODONATA FROM THE VICINITY OF CULTUS LAKE, B.C.

BY E. M. WALKER AND W. E. RICKER,

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The following notes are based on collections made by the junior author and a few other collectors whose names are indicated in brackets. The descriptions of localities, including faunistic observations are also made by the junior author, while the senior author is responsible for determinations and notes on the geographical distribution of the species.

The collections were made in a limited area of the southwestern mainland of British Columbia, about 15 miles square, lying between the Fraser river and the international boundary, and including the town of Chilliwack. Most collecting was done in the immediate vicinity of Cultus Lake (latitude  $49^{\circ} 4' N.$ , longitude  $122^{\circ} 0' W.$ ). The climate of the lowland parts of this region is moist and equable, and it belongs in the Vancouverian faunal zone. Its vegetation was originally a temperate rain forest, dominated by the large Douglas fir (*Pseudotsuga mucronata*), Western Red Cedar (*Thuja plicata*) and Western Hemlock (*Tsuga heterophylla*), but in the Fraser Valley most of the land has been cleared for agriculture. In the area under consideration there exists a considerable variety of aquatic habitats, but in only one or two has any attempt at comprehensive collecting of Odonata been made.

*Cultus Lake.* Cultus Lake lies in a glaciated U-valley between two mountain ranges, but itself is only about 160 feet above sea-level. It is three miles long, and one-half to one mile broad; mostly deep, clear, and with the epilimnion quite warm in summer ( $20-22^{\circ} C.$ ). The shores are of stones or bed-rock, with small patches of sand. Emergent vegetation consists of *Scirpus validus* in several places among the stones, and small clumps of *Typha latifolia* or even *Nymphaea polysepala* in the most sheltered locations; but most of the shore-line is bare. Four odonates are typical of the lake proper: *A. emma*, *E. cyathigerum*, *M. rickeri* and *Ae. umbrosa*. Also found on or near the lake at times of their abundance are *Ischnura* sp., *Ae. palmata*, *Ae. californica*, *Ae. i. nevadensis* (this possibly more common than the single specimen suggests), *O. occidentis*, *S. corruptum*, *S. pallipes* and other species of *Sympetrum*.

*Sweltzer Creek.* (nearest post office—Cultus Lake). This is the outlet of Cultus Lake, a warm stream of moderate current, and volume of flow about one cubic foot per second in summer. Its upper end is muddy and overgrown with *Salix*; below this a short open stretch, with *Lysichiton kamtschaticense* and *Lysimachia thyrsiflora* on exposed gravel bars; then a more rapid section with stony bottom, margined by dense forest. The most conspicuous odonate is *Argia*

*emma*, which is extremely abundant along every part of the stream throughout summer and early autumn. Mated pairs appear to prefer the long clumps of red willow roots for ovipositing. The creek is home also to *E. cyathigerum*, *O. occidentis* and *O. specularis*, all of which breed there. There are many other species taken along the creek, but whether they are resident or wanderers was not established: *I. cervula* and *I. perparva*, the three common *Aeschnae*, *C. dorsalis*, *T. spinigera*, *M. rickeri*, the three *Libellulae* and all the *Sympettra* except *S. danae* and *S. costiferum*.

*Liumchin Creek* (nearest post office—Cultus Lake). About the same size as Sweltzer, but contrasting sharply with it is the cold swift stony Liumchin creek. It rises from snowbanks in the mountains and runs through a narrow wooded valley separated from Cultus Lake by a mountain ridge, but only three miles distant from it to the eastward. In an open glade in the lower part of its course *Ae. palmata*, *Ae. californica* and *L. quadrimaculata* have been taken, *Macromia* and *Tetragoneuria* seen; none of which are likely endemic species. Farther upstream, at about 800 feet elevation, was found a single female of *Tanypteryx hageni*, resting on a log above the water. On another occasion a dragonfly thought to be of this species was observed ovipositing at intervals as she flew along midstream. Such a habitat is not in accord with Kennedy's\* postulation, from the observations of related species, that *T. hageni* would prove to be an inhabitant of bogs and swamps.

*Chilliwack River*. (nearest post office—Vedder Crossing). The Chilliwack River is much larger than either of the above, cold and subject to severe floods and with a constantly shifting channel. Little collecting has been done along it, and the species taken were likely bred in adjacent, more congenial, bodies of water. It lies about two miles north and east of Cultus Lake.

*Lost Slough* (nearest post office—Cultus Lake). This is a partly boggy slough of about five acres extent, situated a mile east of Cultus Lake in a hollow at about 300 feet elevation, and surrounded by heavy forest. Most of it is covered by tall *Scirpus* and *Typha*, with patches of *Carex*, bog shrubs, *Sphagnum* and perhaps fifty square rods of very shallow open water. Eleven species were taken here, of which *I. erratica* was represented by two specimens only; the others all appeared to be common at some time or other: *L. dryas*, *I. cervula*, *I. perparva*, *Ae. palmata*, *S. semicircularis*, *L. quadrimaculata*, *S. pallipes*, *S. obtrusum*, *S. decisum* and *L. hudsonica*.

*Indian Reserve Sloughs*. (nearest post office—Vedder Crossing). Several small sloughs, much smaller than the above, about a mile and a half north of Cultus Lake, lying mostly in open fields. Their vegetation is principally *Carex*, and areas of open water are very limited. Two small spring creeks are in the immediate vicinity, and also the lower part of Sweltzer Creek. As far as studied, the odonate fauna has proved similar to that of Lost Slough, but several species are missing as yet, and a few are additional: *L. disjunctus*, *A. abbreviatum*, and a sight record of *S. danae*.

*Hope Slough* (Post offices: Chilliwack and Rosedale). The Hope Slough or river is a small stream rising in the mountains; the section here considered

\*C. H. Kennedy: Notes on the life history and ecology of the dragonflies (Odonata) of Central California and Nevada. Proc. U. S. Nat. Mus. 52: 483-635. 1917.



flows in a broad channel filled in floodtime by Fraser river water, and in summer much choked by *Typha*, *Scirpus*, *Equisetum*, *Potamogeton* and other emergent or submerged aquatic plants. The summer odonate fauna is dominated by *Sympetrum*, of which six species have been taken; *S. vicinum* and *S. corruptum* are missing as yet. We have specimens also of *E. cyathigerum*, *E. carunculatum*, *I. cervula*, and sight records of *A. junius* and *L. forensis*.

*Chilliwack Golf Course*. The links of the Chilliwack Golf Club is bordered by a slough larger, deeper and more stagnant than Hope Slough, but similar in many respects. *L. disjunctus*, *E. carunculatum*, *L. forensis*, *S. corruptum*, *S. costiferum*, *S. vicinum* and *L. intacta* were taken here.

*Sumas Canal Sloughs*. (nearest post office—Chilliwack). These lie north of the Sumas river about ten miles west of Chilliwack, and are of the same type as the one last mentioned. They were visited only in May, when *Ae. californica*, *C. shurtleffi*, *T. canis* and *L. quadrimaculata* were taken. These species are probably part of the spring fauna of the other similar habitats also.

*Liumchin Mountain Sloughs* (nearest post office—Cultus Lake). Several small (up to 500 square yards), shallow (up to 3 feet) sloughs lie on Liumchin mountain in open meadows at 5000 feet elevation, and about five miles south-east of Cultus Lake. They probably freeze solid in winter, and do not clear of snow until the June or July following. Their bottom is of bare mud, with sedges about the margin only. *S. albicincta* is very abundant, and the only common dragonfly. *Ae. juncea* was also taken.

*Liumchin Mountain Lake* (Dipper Lake). A lake of ten acres extent, moderately deep, at 4700 feet elevation, and surrounded by forest of *Abies amabilis* and *Tsuga Mertensiana*. The shores are stony or muddy, the latter with sparse-set stalks of *Equisetum*. Again *S. albicincta* was the commonest dragonfly; *I. cervula* and *Ae. palmata* were also taken. *S. decisum* was taken on Liumchin mountain, remote from any water.

#### *Distributional Notes.*

The list of species, as already stated, is not representative of all the regional types of aquatic habitats, but is probably complete for Cultus lake and its outlet, Sweltzer Creek, at least in so far as resident species are concerned.

The most noteworthy records are undoubtedly those of *Macromia rickeri*, *Tanypteryx hageni* and *Octogomphus specularis*, the first species being new\* and the other two reported for the first time from Canada. *Macromia rickeri* has also been found at Salmon Arm, B. C. and thus occurs in both the Okanagan and Vancouverian faunal areas, but is limited to the Western Transition Zone, so far as these records indicate. Its close relative, *M. magnifica*, occurs from Vernon, B. C., southward to Arizona and California, and *M. rickeri* may be regarded as probably a northern derivative of this species.

*Tanypteryx hageni* is an archaic relic species of the mountains, known in the United States from Washington to Nevada. Since it is apparently a mountain stream form it is not to be looked upon as a true member of the Vancouverian faunal area, its distribution, like that of other stream forms, such as the Cordulegasters, being largely independent of the so-called faunal areas.

\*Can. Ent. LXIX, 5-13, 1937.

*Octogomphus specularis*, which is by no means uncommon in Sweltzer Creek, has a similar but more extended range in the United States, from Washington to Mexico and Lower California.

Another species limited to the extreme southwestern part of British Columbia, including the southern extremity of Vancouver Island, is *Ischnura erratica*. It ranges southward to California and is rare in British Columbia.

The remaining western species, whose distributional ranges lie mainly in the United States are *Argia emma*, *Ischnura cervula*, *I. perparva*, *Amphiagrion abbreviatum*, *Aeshna californica*, *A. multicolor*, *Ophiogomphus occidentis*, *Libellula forensis* and *Sympetrum pallipes*.

All of these species range in British Columbia at least to the limits of the Transition Zone (Vancouverian and Okanagan faunal areas). *Sympetrum pallipes* occurs eastward as far as the Waterton Lakes Park, Alta. and southward along the Rocky Mountains as far as Utah. It appears to be mainly a species of the Transition Zone and adjoining boreal areas. The other species, with the possible exception of *Ophiogomphus occidentis*, appear to belong chiefly to the Upper Sonoran Zone.

The other species of coastwise distribution but occurring much farther northward is *Cordulegaster dorsalis*, which is found from California to Alaska and thus ranges throughout the Sitkan faunal area.

Two other species, *Aeschna palmata* and *Somatochlora semicircularis*, are confined to the western Cordillera but both are generally distributed boreal species which probably occur throughout the entire province.

All the remaining species are widely distributed transcontinental forms but not all are of general occurrence in British Columbia.

Those which probably occur only in the more southern parts of the province are *Enallagma carunculatum*, *Anax junius*,\* *Libellula lydia*, *Sympetrum vicinum*, *S. semicinctum*† and *Leucorrhinia intacta*. The two species of *Tetragoneuria* and *Sympetrum corruptum* should probably also be included but they range well into the boreal region of other parts of Canada and their distribution in British Columbia is as yet little known.

The other species are all general in British Columbia, where collections have been made, and have a more or less extensive distribution in the boreal region across the continent, although not all are confined to this region. *Aeshna juncea* and *Somatochlora albicincta* are, in general, species of higher latitudes or altitudes than the other species, but, on Vancouver Island, *S. albicincta* reaches sea-level. It is a species that is apparently limited in the adult stage by high summer temperatures.

Finally, mention should be made of *Aeschna interrupta*. It has been considered here as a species only, apart from the various geographical races into which it is divided. The races are ill-defined in British Columbia, where the species is continuously distributed and, while the material from Cultus Lake is referred to the most westerly form *nevadensis*, this race apparently grades imperceptibly into the more eastern *interna*, which is fairly typical in the Kootenay district.

\*This species has been twice recorded for Alaska but almost certainly as a wanderer from the south.

† This species occurs in the Kootenayan faunal area and even at Field in the Alpine area (Buckell '37) but is not general in the boreal region of other parts of Canada.

The status of the various races of *Ae. interrupta* require revision based on plenty of material from all parts of British Columbia and the western United States.

#### ANNOTATED LIST OF SPECIES.

##### *Zygoptera.*

1. *Lestes dryas* L. (*uncatus* Kby.). Lost Slough, 6.viii.32, ♂ ♀ in cop. and 1 ♂; 1.vii.36, 1 ♂. Indian Reserve sloughs, 1.viii.36, 1 ♂ 2 ♀.

2. *Lestes disjunctus* Selys. Indian Reserve slough, 1.viii.36, 1 ♂; Chilliwack golf course 4.viii.36, ♂ ♀ (S. Spencer); 15.viii.36, 6 ♂.

The large size of the British Columbian *L. disjunctus* is well shown in the specimens from Chilliwack golf course. Of six males the smallest measures 36.5 mm. in total length, hind wing 19, while in the two largest the total length is 39.5 with hind wings 21 mm. long. The others are very nearly as large.

3. *Argia emma* Kennedy. Cultus lake, 18.vii.28, pair in cop. (T. B. Kurata); Sweltzer Creek, 23.vi.32, 1 ♀; 19.viii.32, pair in cop.; 26.viii.32, 2 ♀; 20.vi.34, 1 ♀; 24.vi.34, 2 ♂; 4.vii.34, 1 ♂; 22.vii.34, 2 ♀; 23.vii.34, 4 ♂ 3 ♀; 25.vii.34, 1 ♀; 19.vi.35, 5 exuviae; 22.vi.35, 1 ♀ teneral; 14.vii.35, 2 pairs in cop.; 1.viii.36, 4 ♂ 2 ♀; 13.viii.37, 2 ♂, abundant on this date. Also common along the shores of Cultus lake itself. It is seen on the wing until late September.

4. *Enallagma cyathigerum* (Charp.). Cultus L., 20.v.34, 2 ♀; 24.v.34, 1 ♀; 26.v.34, 1 ♀; 23.vi.34, 14 ♂ 6 ♀; 4.vii.34, 1 ♂; 24.vii.34, 1 ♂; 12.viii.34, 1 ♂; 1.viii.35, 1 ♂ 1 ♀; 10.ix.36, 1 ♂; (Some of these were undoubtedly taken along Sweltzer creek). Hope Slough, Rosedale, 25.vii.36, 1 ♂; 15.vii.36, 4 ♂ 1 ♀. The species is on the wing at Cultus lake until early November.

5. *Enallagma carunculatum* Morse. Hope Slough, Chilliwack, 25.vii.36, 2 ♂ 1 ♀; 15.viii.36, 1 ♂. Chilliwack golf course, 15.viii.36, 1 ♂.

6. *Ischnura cervula* Selys. Sweltzer creek, 7.vi.34, 1 ♀; 4.vii.34, 2 ♂; 22.vii.34, 1 ♀; 23.vii.34, 1 ♂; Lost Slough, 4.viii.34, 3 ♂; Indian Reserve sloughs, 19.vii.36, 2 ♂. Liumchin Mountain sloughs and Lake 26.viii.34, 1 ♀; 2.ix.34, 2 ♀. Hope Slough, Chilliwack, 25.vii.36, 3 ♂ 2 ♀.

7. *Ischnura perparva* Selys. Lost Slough, 4.viii.34, ♂ ♀; Sweltzer creek, 1.viii.36, 6 ♂ 1 ♀.

8. *Ischnura erratica* Calvert. Lost Slough, 4.viii.34, 1 ♂; 1.vii.36, 1 ♂.

9. *Amphiagrion abbreviatum* Selys. Indian Reserve sloughs, 19.vii.36, 3 ♂ 2 ♀; 1.viii.36, ♂ ♀.

##### *Anisoptera*

10. *Aeschna interrupta nevadensis* Walk. Cultus L., 1.x.34, 1 ♀. This specimen has the thoracic stripes broader than in *lineata* and divided, as they frequently are in *nevadensis*, particularly on the coast, from Vancouver Island northward. This specimen closely parallels the eastern *interrupta*.

11. *Aeschna canadensis* Walker. Chilliwack golf course, 6.ix.37, 1 ♂ (S. Spencer).

12. *Aeschna juncea* L. Swampy pool, Liumchin Mt., 26.viii.34, 1 ♂.

13. *Aeschna palmata* Hagen. Cultus lake, 2.ix.36, 1 ♂. Lost Slough 6.viii.32, 3 ♂; 7.viii.32, 1 ♂; 4.viii.34, 1 ♂. Liumchin creek, 1.vii.36, 1 ♀; Liumchin Mt. Lake, 3.ix.34, 1 ♂. Chilliwack golf course, 6.ix.37, 2 ♂ (S. Spencer).

14. *Aeshna umbrosa* Walk. Cultus L., 28.x.31, 2♂. Sweltzer creek, 30.x.33, 2♂; 19.vii.36, 1♂; Indian Reserve Slough, 19.vii.36, 1♂. Sumas Game Preserve, Fraser R., 13.xi.33, 1♂. The specimens all seem to belong to *umbrosa* rather than *occidentalis*.

15. *Aeshna californica* Calvert. Cultus L., 22.v.32, 1♂; 20.vi.35, 1♂. Sweltzer creek, 19.vii.36, 1♂. Liumchin creek, 23.vi.36, 1♀. Sumas Canal, 11.v.33, 1♂ 1♀. Sumas Mt. 5.vi.37, 1♂.

16. *Aeshna multicolor* Hagen. Chilliwack golf course, 6.ix.37, 1♂ (S. Spencer); Chilliwack R., 32, 1♂.

17. *Anax junius* (Drury). Chilliwack golf course, 6.ix.37, 1♂.

A female taken from automobile radiator, after a trip from Hope to Cultus Lake, 14.viii.36. Probably taken near the sloughs a few miles east of Chilliwack, where the species has been observed on the wing.

18. *Tanypteryx hageni* (Selys). Liumchin creek., 8.vii.34, 1♀.

19. *Ophiogomphus occidentalis* Hagen. Cultus L., 30.vii.32, 1♀. 20.viii.32, 1♂; 1.viii.36, 1♀; 2.viii.36, 1♂; 17.viii.36, 1♀; 13.vii.37, 1♂ (Betty Robertson); 7.ix.37, 1♂ 1♀; 10.ix.37, 1♂; 14.ix.37, 1♂; 21.ix.37, 1♂. Sweltzer creek 23.vii.34, 9♂; 25.vii.34, 1♂; 10.vi.35, 2 exuviae; 21.vi.35, 1♂ and exuviae; 19.vi.36, 1♀; 10.viii.36, 1♂ (Betty Robertson); 2.ix.36, 1♀ Exuv. Cultus L., 19.vii.36.

20. *Octogomphus specularis* Hagen. Sweltzer Creek., 15.vi.33, 1♂; 16.vi.33, 1♀ teneral; 10.vi.35. exuv; 14.vi.35 exuv.; 19.vii.36. 8♂; 1.viii.36, 1♂. Hatchery Creek, 16.vii.36. 2♂ (F. C. Whitehouse).

21. *Cordulegaster dorsalis* Hagen. Sweltzer creek, 25.viii.36, 1♂ (Edward Robertson); 9.viii.37, 1♂ (Edward Robertson).

22. *Cordulia shurtleffi* Scudder. Sumas Canal Slough, 11.v.33, 4♂.

23. *Somatochlora semicircularis* Selys. Lost Slough, 1.vii.36, 3♂ 1♀. The ♀ was found in cop. but ♂ not taken. Another ♀ observed ovipositing.

24. *Somatochlora albicincta* (Burm.). Sloughs, Liumchin Mt., 4900 feet, 15.ix.32, 1♂ 1♀ ovipositing; 26.viii.34, 8♂; 2.ix.34, 6♂ 1♀; 3.ix.34, 1♂; 16.viii.36, 2♂; 29.viii.37 1♂. Liumchin Mt. lake, 16.viii.36, 3♂ 2♀, both females ovipositing. Several dozen dead of both sexes were found floating on the surface of the sloughs, 16.viii.36.

As found on Liumchin Mt. this species is larger and darker than typical boreal *albicincta* but somewhat smaller than specimens found on Vancouver Island near sea level. Measurements of 4 males and 2 females are as follows: total length ♂ 49-52 mm., ♀ 50-51 mm.; abd. (inc. app.) ♂ 35-37 mm., ♀ 37 mm.; hind wing ♂ 31-32.5 mm., ♀ 32.5.

25. *Tetragoneuria canis* McLachlan. Sumas Canal slough, 11.v.33, 1♂ 3♀. Sumas Mt., 5.vi.37, 4♂.

26. *Tetragoneuria spinigera* Selys. Sweltzer creek, 19.vii.36, 1♀. Cultus lake, 28.v.33, 1 full grown nymph.

27. *Macromia rickeri* Walk. Cultus L. v. 33, 1♀ teneral; 5.viii.34, 1♂; 26.vi.35, 2♂ emerged 10 p.m.; 3.vii.35, 1♂ emerged; 28.v.35, 9 nymphs (5♂ 4♀); 12.vi.36, 1 nymph; 5.vi.36, 4 nymphs, 3 full grown ♀, 1 immature ♂; 22.vi.36, 1♀ emerged; 7.vii.36, 2♂ (F. C. Whitehouse); 19.vii.36, 1♀ (F. C.

Whitehouse); 5.vii.37, 2♂ (E. Robertson); 8-12.vii.37, 9♂; 15.viii.37, 2♂; 26.vii.37, 1♀; 10.ix.37, 2♂. Sweltzer creek, 14.viii.36, 1♂ (Edward Robertson). Chilliwack R., 23.vi.36, 1♀. Exuviae, Cultus L., 23.vi.36, 4♂.

28. *Libellula quadrimaculata* L. Sumas Canal Slough, 11.v.33, 1♂ 2♀. Lost Slough, 1.vii.36, 1♂ (abundant, ♀'s ovipositing). Sumas Mt., 5.vi.37, 1♂ rather teneral. Indian Reserve Sloughs, 19.vii.36, 1♂; Sweltzer creek, 1.viii.36, 1♂; Liumchin creek, 23.vi.36, 1♀.

29. *Libellula forensis* Hagen. Sweltzer creek, 25.vii.34, 1♀. Chilliwack golf course, 11.viii.36, 2♂ (S. Spencer); 6.ix.37, 1♂ (S. Spencer).

30. *Libellula lydia* Drury. Sweltzer creek., 23.vii.34, 4♂. Vedder Crossing, 19.vii.36, 1♂.

31. *Sympetrum corruptum* Hagen. Cultus lake, 6.ix.36, 1♂. Found dead near Sweltzer creek, 26.viii.36, 1♀ (Betty Robertson). Chilliwack golf course, 11.viii.36, 1♂ 1♀ (teneral) (S. Spencer).

32. *Sympetrum pallipes* Hagen. Cultus lake, 27.viii.36, 1♀; 2.ix.36, 1♂. Lost Slough, 6.viii.32, 2♀ teneral (not certainly determinable, perhaps *decisum*); 4.viii.34, 1♀ newly emerged (?). Sweltzer creek, 24.ix.34, 2♂ 1♀; 19.vii.36, 1♂; Indian Reserve Sloughs, 19.vii.36, 2♂; 1.viii.36, 2♂. Hope Slough, Rosedale, 15.viii.36, 1♀ teneral. Chilliwack golf course, 6.ix.37, 1♂ (S. Spencer).

The specimens from the Indian Reserve Sloughs are of good size, although slightly smaller than Washington specimens. Those from Sweltzer creek are distinctly smaller. These differences may be illustrated by the following measurements of typical males.

Locality	Total Length	Abdomen	Hind Wing
Indian Reserve	37.5	24.5	27.5
Campbell L., Anacortes, Wn.	38.0	26.0	28.5

33. *Sympetrum obtrusum* (Hagen). Lost Slough, 6.viii.32, 1♂ 1 teneral ♀; 7.viii.32, 1♂; 4.viii.34, ♂ & teneral ♀; 1.vii.36, 1♀. Sweltzer creek, 30.viii.34, 1♂. Indian Reserve Sloughs, 1.viii.36., 4♂; 11.vii.37, 1♂; Hope Slough, Chilliwack, 15.vii.36, 2♂ 1♀.

34. *Sympetrum decisum* (Hagen). Sweltzer creek, 24.ix.34, 6♂ 1♀; Indian Reserve Sloughs, 2.viii.36, 4♂; Lost Slough 1.vii.36, 1♂; Hope Slough, Rosedale, 25.vii.36, 1♂ 2♀; 15.viii.36, 2♂ 2♀; Cultus Lake, 27.viii.36, 1♀; Liumchin Mt. (4500 ft.), 17.viii.34, 1♂. Chilliwack golf course, 11.viii.36, ♂ ♀ (S. Spencer); 6.ix.37, 1♂ (S. Spencer) Chilliwack, 7.viii.34, 1♀; Douglas L., 26.vii.34, 1♂ 3♀.

There is, as usual with *Sympetrum*, considerable variation in size. Specimens at Chilliwack in August 11, 1936, are very large, exceeding in size any specimens seen from eastern Canada. The majority, however, are of about the usual size of eastern individuals.

35. *Sympetrum costiferum* (Hagen). Chilliwack golf course, 11.viii.36, teneral ♀, ♂ newly emerged (S. Spencer); 6.ix.37, 1♂ (S. Spencer). Hope Slough, Rosedale, 15.viii.36, newly emerged ♂.



36. *Sympetrum vicinum* (Hagen). Sweltzer creek, viii.32, adult ♂; 22.ix.37, pair per collem, ovipositing. Chilliwack golf course, 15.viii.36, ♂ ♀ very teneral.

37. *Sympetrum semicinctum* (Say). Cultus L., 7.ix.37, 1 ♀. Sweltzer creek, 24.ix.34, 2 ♀. Hope-Slough (Chilliwack) 25.vii.36, 1 ♂; Hope Slough (Rosedale), 15.viii.36, 3 ♂, 2 somewhat teneral.

The specimens are all large as compared with those from eastern Canada. The smallest and largest males, from Hope Slough, measure as follows: Total length 31.0, 35.5; abd. 18.5, 23.0; h.w. 22.5, 26.5.

38. *Sympetrum dance* (Sulzer). Hope Slough, Rosedale, 15.viii.36, 1 specimen lacking abdomen. Another seen at close range in the Indian Reserve Sloughs, 19.vii.36.

39. *Leucorrhinia hudsonica* (Selys). Lost Slough, 7.viii.32, 2 ♂; 1.vii.36, 2 ♂.

These are all large specimens, measuring as follows: total length 32.5-33.0; abd. 22.0; H. W. 23.5-25.0.

40. *Leucorrhinia intacta* (Hagen). Chilliwack golf course, 11.vii.36, 1 ♀ (S. Spencer). Sumas Mt., 5.vi.37, 2 ♀, one with very yellow wing bases. Vedder canal bridge, 5.vi.37, 3 ♂ 2 ♀.

#### NOTES ON SOME ARCTIC COLLEMBOLA.

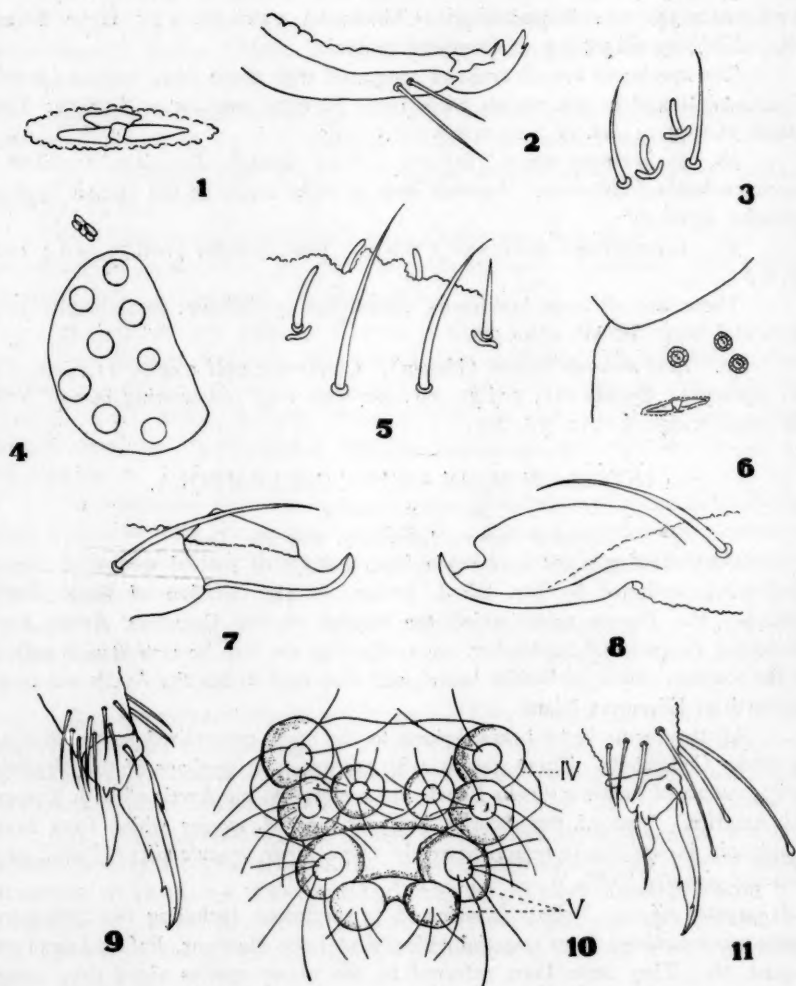
BY H. G. JAMES,

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The following notes were made from a study of several species of Arctic *Collembola* collected by Mr. W. J. Brown, of the Division of Entomology, Ottawa. Mr. Brown accompanied the voyage of the Canadian Arctic Patrol during August and September, 1935. During the trip he was able to collect on the southern shore of Baffin Island, and also well within the Arctic Circle as far north as Ellesmere Island.

All the forms listed below belong to the more generalized subfamilies of the Order Collembola. These species, with the exception perhaps of the Nearctic variety *catena* of *Isotoma viridis* Bourl., are common to the Arctic of both Europe and America. Two of the records, however, are of species which have been found only in the Arctic regions, namely *Onychiurus groenlandicus* Tullb., and *Neamura gigantea* Tullb.

*Achortutes viaticus* Tullb. A series of 43 specimens, including five immature stages was examined from material collected at Lake Harbour, Baffin Island on August 26. They have been referred to the above species since they agree essentially with Dr. Folsom's description of some European forms of *A. viaticus*. The mucro is of the same form while the tenant hairs on the feet, the antennal organs and body clothing are typical. As this species is widely distributed it might be expected that some local variation might occur in widely separated land areas. This appears evident from characters in the Baffin Island specimens. On the head may be found differences in the size and arrangement of the ocelli, while the segment ratios of the antennae are nearer 6:8:8:9. The claws also have undergone modification, the outer claw being wider at the base, more curving, and



- 1.—*Onychiurus groenlandicus* Tullb. Postantennal organ with three tubercles, x291. 2.—*Isotoma viridis* Bourl. var. *catena* Guth. Lateral aspect of left mucro, x200. 3.—Antennal organ of var. *catena* Guth., x200. 4.—*Achorutes viaticus* Tullb. Eyes on left side with postantennal organ, x473. 5.—*A. viaticus* Tullb. Dorsal aspect of antennal organ, x417. 6.—*Onychiurus groenlandicus* Tullb. Left postantennal organ and pseudocelli, x101. 7.—*Achorutes viaticus* Tullb. Lateral aspect of left mucro, x417. 8.—*A. viaticus* Tullb. Lateral aspect of right mucro, x417. 9.—*I. viridis* Bourl. var. *catena* Guth. Right hind foot, x200. 10.—*Neanura gigantea* Tullb. Dorsal aspect of abdominal segments IV-VI, x13. 11.—*Achorutes viaticus* Tullb. Left hind foot, x90.

strongly unidentate on the inner margin. There is also to be found a pair of minute lateral teeth midway between the inner tooth and the apex of the claw. The inner claw appears as in Figure II with a basal tubercle, but otherwise has the form of the European specimens. As mentioned before the mucrones are typical in shape but are longer in proportion to the dentes, more in the ratio of 2:5 than 1:3. The rami of the tenaculum bear three teeth, thus differing from the European form in which it is quadridentate.

*Neamura gigantea* Tullb. This species has been previously reported from Northern Europe, Alaska, and Ellesmere Island. It is most notable for its size, often reaching a length of 5 mm. The two specimens taken by Mr. Brown at Lake Harbour, Baffin Island on August 17, are much smaller than this and are probably not fully developed. The form and position of the postantennal organ as well as the arrangement of the ocelli follow closely the typical form of this species. The head and body of the insect bear, potentially at least, the usual number of tubercles, which appear darker than the surrounding integument. Those on the head are of equal size at this stage. The body tubercles are quite regular as far as Abd. IV. On Abd. V, however, the median tubercles are absent, the segment being expanded laterally to form a large tubercle on each side. Judging by the number of long setae borne by the large tubercle, it would seem that the latter has resulted from a fusion of two or perhaps three smaller ones. Under high magnification the longer setae on both head and body appear feathered; the shorter ones are not serrate as in *N. serrata* Fols.

The claws of the Baffin Island specimens lack the strong inner tooth of the typical form. In addition to the usual apical hairs may be found two tapering setae which are as long as the claw itself.

*Isotoma viridis* Bourl. Twenty-four specimens are recorded from River Clyde, Baffin Island on September 15. All agree structurally with the Alaskan form of *I. viridis* (Folsom, 1902). From the latter as well as the variety *arctica* Schott, however, there is a great difference in the arrangement of the dark pigment. On each dorsum may be found an irregular dark patch, which forms a tapering median dorsal stripe along the thorax and abdomen. In the younger specimens the stripe widens laterally to form a solid deltoid marking. This marks each segment from the mesothorax to second abdominal. In the older individuals, the median stripe is often masked by general pigmentation. The colour of the specimens preserved in alcohol varies from a light to a dark brown, the darker ones averaging 2.5 mm. in length.

*Isotoma viridis* Bourl. var. *catena* Guth. Probably the most northern record of this variety is a single specimen taken at Craig Harbour, Ellsmere Island, on September 9. This specimen shows a close structural resemblance to the typical *I. viridis*, especially as regards the form and dentition of the unguis and the relative lengths of the segments of the antennae.

The mucro is distinctly quadridentate. In addition the inner claw, as shown in Figure 9, is relatively narrow and lacks the inner tooth of the original description.

*Onychiurus groenlandicus* Tullb. This material was taken at Craig Harbour, Ellsmere Island on September 9. The specimens examined agree closely with the

redescription of Tullberg's species. In our material there are 2-3 tubercles comprising the postantennal organ. 19 individuals were also collected at River Clyde, Baffin Island. Little variation is shown from the Ellesmere form.

*Onychiurus armatus* Tullb. Five specimens are recorded from River Clyde, Baffin Island on September 15. All are more or less typical except that in our specimens there are only two oblique pseudocelli on each side of the head. Such an arrangement agrees with Agren's notes on the European forms of *O. armatus*. In addition the unguis bears a well developed tooth on its inner margin, in that character resembling *O. pseudarmatus* Fols.

*Onychiurus* sp. A single specimen taken with *O. armatus* from Baffin Island deserves attention. Although approaching *O. litoreus* Fols. in many respects, the similarity ends when the pseudocelli are studied. The number and arrangement of the latter are distinct, and were found to be placed as follows: Base of antennae 2 + 2; posterior margin of head 1 + 1; prothorax 1 + 1 (dorsal) and 1 + 1 (lateral); mesothorax 2 + 2 (oblique) and 1 + 1 (lateral); metathorax 2 + 2 (oblique) and 1 + 1 (lateral); metathorax 2 + 2 (oblique) and 1 + 1 (lateral). Abdominal segments I-IV, 3 + 3 (2 + 2 being oblique); Abv. V, 2 + 2.

The postantennal organ, as far as could be seen, is of the simple type comprising about 30 tubercles. The unguis is slightly curving, untoothed and twice as long as the inner claw. The inner claw also resembles that of *O. litoreus* Fols.

#### REFERENCES

- Axelsson, W. M.—1912 "Die Apterygotenfauna Finlands." II Spezieller Teil. Acta Soc. Sci. Fennicae, Vol. 40, No. 5.  
Folsom, J. W.—1916 "North American Collembolous Insects of the Subfamilies Achorutinae, Neanurinae, and Podurinae" Proc. U. S. Nat. Mus., Vol. 50, pp. 477-525.  
1917 "North American Collembolous Insects of the Subfamily Onychiurinae. Proc. U. S. Nat. Mus. Vol. 53: pp. 637-659.  
Mills, Harlow B.—1934 "A Monograph of the Collembola of Iowa," Collegiate Press, Ames, Iowa.

#### NEWS AND VIEWS

##### MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

At the 65th annual meeting of the Montreal Branch of the Entomological Society of Ontario, held in the Redpath Museum, McGill University, Montreal, of May 13th, the following officers were elected for 1938-1939: President, Mr. G. A. Moore; Vice-president, Rev. O. Fournier; Secretary-treasurer, Mr. H. A. U. Monro.

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